CS-15 Ⓢ

MCA (III Year)

Term-End Examination

June, 2007

CS-15 Ⓢ : RELATIONAL DATABASE MANAGEMENT SYSTEM

Time : 3 hours *Maximum Marks : 75*

Note : *Question number 1 is* ***compulsory****. Answer any* ***three*** *questions from the rest.*

1. (a) Construct an ER-diagram for a University's/College's office. The office contains data about each class, including the instructor, the enrolment, the time and room number of the class. For each student : the number of subjects and the class is recorded. Document all assumptions that you make about the mapping contraints. *8*

(b) What is extendable hashing ? How is a record inserted in such a scheme ? *7*

(c) Discuss the shadow paging recovery scheme. Compare this scheme with the log based recovery scheme. *8*

(d) Describe the scheme of deadlock detection in distributed databases. *7*

2. (a) Table EMP has columns : emp_no, emp_name, basic_pay, d_code.

Table DEPT has columns :

dept_code, dept_name.

Write the following integrity constraints : *6*

(i) Minimum basic salary is 5000 and maximum is 12000.

(ii) emp_name and dept_name are never left blank.

(iii) Values in the field d_code must exist in column dept_code.

(b) Compute the closure of the following set of functional dependencies for relational schema *9*

R = (A, B, C, D, E).

$A \rightarrow BC$

$CD \rightarrow E$

$B \rightarrow E$

$E \rightarrow A$

Also give the candidate keys for R.

3. (a) Consider the following relations :

STUDENT (S#, SNAME)

COURSE (C#, CNAME, TNAME)

STUDIES (S#, C#)

Write the relational algebra queries for the following :

(i) Get student nos. of those students who are not studying in course no. 'C2'.

(ii) Get the student details of those students who are studying in both courses, with course no. 'C4' and course no. 'C6'. *6*

(b) Construct a B-Tree of order 5 (i.e., no. of pointers in a node) for the following key values : 9

3, 20, 10, 4, 32, 8, 24, 36, 30, 12, 62, 28, 58, 74

Also perform the following operations :

(i) Delete key 32

(ii) then, Delete key 62

4. (a) Consider the following database : 9

Employee (emp_name, street, city)

Works (emp_name, bank_name, salary)

Bank (bank_name, city)

Manages (emp_name, mgr_name)

Write SQL queries for the following :

(i) Find the names of all employees who work for Punjab National Bank.

(ii) Find all the employees in the database who live in the same city as the bank for which they work.

(iii) Find the names, street and cities of residence of all employees who work for Punjab National Bank and earn more than Rs. 20,000.

(b) What is intention mode locking scheme ? Discuss intention share and intention exclusive modes. 6

5. Write short notes on the following : *15*

(i) Query optimization

(ii) Lossless Join Decomposition into Fourth Normal Form

(iii) Logical Data Independence

(iv) Hierarchical data implementation

(v) Different types of failure in a database